25X1

DATE 12/2/86 FILE

DOC NO GI M 86-20270

OIR 3

P & PD /

Central Intelligence Agency

FILE

Washington D C 20505

26 NOV 1986

MEMORANDUM FOR: Mr. Scott Danaher
Africa Bureau, Economic Policy Staff
Department of State

FROM: [redacted] 25X1
Chief, Strategic Resources Division
Office of Global Issues

SUBJECT: North Central Ethiopia: Good Crop Conditions Continue in 1986 [redacted] 25X1

1. The attached memorandum is in response to your request for an assessment of the 1986 harvest in portions of north central Ethiopia. The analysis is based on [redacted] unclassified Landsat imagery, augmented with meteorological data. It provides an assessment of the relative growing conditions in the region during 1986, as compared to 1985. Additionally, an evaluation was made of the relative population growth in the area between 1982 and 1985. [redacted] 25X1

2. This assessment was produced by [redacted] 25X1 the Agricultural Assessments Branch, Strategic Resources Division, Office of Global Issues, with assistance from [redacted] 25X1 the Analytical Methods Branch of the Office of Information Resources. [redacted] 25X1

3. Comments and questions are welcome and may be addressed to the Chief, Agricultural Assessments Branch [redacted] 25X1

25X1 [redacted]

Attachment:
25X1 North Central Ethiopia: Good Crop Conditions Continue in 1986 GI M 86-20270, 24 November 1986 [redacted] 25X1

[redacted] [redacted] 25X1

25X1 [redacted]

25X1

SUBJECT: North Central Ethiopia: Good Crop Conditions Continue in 1986

25X1

OGI/SRD/AAB (21 November 1986)

25X1

Distribution:
3 - Scott Danaher, State, AF/EPS
1 - Jean Szymanski, State, AF/E
1 - SA/DDCI
1 - Executive Director
1 - DDI
1 - DDI/PES
1 - NIO/AF
1 - NIO/ECON
1 - CPAS/ISS
1 - D/OGI, DD/OGI
1 - C/OGI/SRD
6 - OGI/SRD/AAB
3 - OGI/EXS/PG
5 - CPAS/IMC/CB
1 - C/ALA/AD/EAB
1 -
1 -

25X1

25X1

25X1

MEMORANDUM

North Central Ethiopia: Good Crop Conditions Continue in 1986

Summary

Our analysis indicates that the 1986 growing conditions in north central Ethiopia were at least as good as those of 1985. The 1986 food supply should be equivalent to 1985, and at worst, food aid requirements should remain constant. In addition, there is no indication that there was a significant increase in population in the area between 1982 and 1985.

25X1

Background

Area of Interest. The principal area of interest in this assessment is Tigray Province west of the 40 degree longitude line and the northern portion of Gonder Province across to the Sudanese border. The map at Figure 1 delineates the specific study area.

25X1

Agricultural Constraints. In general, the soils in the area are not especially fertile and are considered to have severe limitations that reduce the choice of plants to be grown and require special conservation practices. Specifically, the soils are shallow, stony, and have a low moisture-holding capacity. Farming in the area is primarily subsistence, with little use of fertilizers or improved seed varieties. People and draft oxen provide the basic power needs.

25X1

Cropping Patterns. The agricultural year in Ethiopia is marked by light rains from February to May, which result in a small crop in many areas--although not in the area examined in this assessment. The major rainy season is from May to September, with the main harvest taking place from late September through December.

25X1

The major crops grown in the area of interest are teff, sorghum and barley.[1] Sorghum is grown mainly at lower elevations where rainfall is less, while teff is grown at higher elevations

---

[1] Teff is a cereal unique to Ethiopia. It is usually hand-sown in July or August and resembles lovegrass which is grown in the United States as forage. The Ethiopians grow teff for its small seed which they make into flour for a bread called "injera." Although teff requires considerable labor and the yields are low, it is preferred by the Ethiopians for bread making. Injera made from teff stays supple for two to three days, whereas bread made from other grains turns hard within a day. For those eating it, teff provides two-thirds of the population's protein intake.

25X1

25X1

25X1

25X1

where there is more precipitation. Pulses (various peas and beans) account for approximately 15 percent of the area's crops, with small gardens providing a variety of vegetables. Planting of crops can start as early as April or May. 25X1

Seedbed preparation is rudimentary with farmers using wooden plows fixed with small iron or steel points which crumble the soil. The land is plowed several times during the year in order to increase rainfall absorption and reduce run-off. 25X1

Methodology

The primary goal of this study was to determine the condition of the crops in the indicated area and to assess what production levels were in 1986, relative to 1985. Accurate, historical production figrues are not available for the entire area, as the Ethiopian government stopped reporting harvest data for Eritrea and Tigray in 1979. Reasonably reliable data are available for Gonder; however, they are reported on a provincial basis and it was not possible to evaluate what percentage of the total province harvest could be accounted for by the northern section included in our study. 25X1

25X1

25X1

it was not possible to determine the relative amount of land under cultivation as compared to last year. Thus, the assumption has to be made that no less land was under cultivation in the area during 1986 than there was during 1985. 25X1

Given the constraints on our ability to collect data, it was decided to evaluate the overall growing conditions within the area and to make a generalized evaluation of the 1986 crop potential as comapred to 1985. The assessment was done in the following manner:

25X1

25X1

25X1

- Historical crop information indicates that years of good harvest coinicide with years of favorable precipitation. Thus, 1986 precipitation data were used as an additional indicator of the crop potential in the study area. 25X1

25X1

Estimate of Growing Conditions

Our analysis indicates that the growing conditions for 1986 were at least as good as those of 1985. Thus, for purposes of making decisions about food requirements within the area of study during 1986-87, it can be assumed that the food supply will be equivalent to last year's, and at worst, the aid requirement should remain constant.[2]

25X1

This analysis is supported by the comparison of Landsat imagery between 1985 and 1986 (see Figures 1 and 2). There is a significant increase in the total hectarage rated as potentially good in 1986, as compared to 1985 (see Table 2). 25X1

25X1

25X1

An analysis of precipitation data within the area of study suggests that rainfall was somewhat below average during 1986 (see Figure 3). However, the deficit is localized and is not of the magnitude which would necessarily reduce yields. Thus, although somewhat below normal, the precipitation data support the assessment that the 1986 growing conditions are at least as good as those in 1985.

25X1

---

[2]Again, this analysis is based upon the assumption that the total amount of cultivated hectarage did not change between 1985 and 1986. As previously noted, it was not possible to refute the assumption on the basis of imagery 25X1
However, it should also be noted that there was no collateral reporting that would serve to refute the assumption. Thus, it seems a legitimate premise. 25X1

25X1

25X1

25X1

Estimate of Relative Population Size

An additional question addressed in this study was whether or not the population in the area of study had been swollen by refugees in the past few years. [redacted] 25X1, 25X1 there was no increase in population within the area between 1982 and 1985 beyond what would be expected as the result of normal growth rates for the region. Thus, the food aid requirements are not likely to fluctuate due to a sudden increase or decrease in population size stemming from refugee movement.[4] [redacted]

25X1

[redacted]

25X1

25X1

25X1

TABLE 1
Vigor Analysis

State of Crop	Probable Yield (Percent of Historical Maxixmum)
Good	75 - 100
Fair	45 - 74
Poor	0 - 44

(This scheme has been validated on crops in other parts of the world, but is applicable to all regions. It is based on vigor analysis, stand density, soil moisture and degree of cumulative plant stress.)

TABLE 2
Vigor Ratings
1985 vs 1986

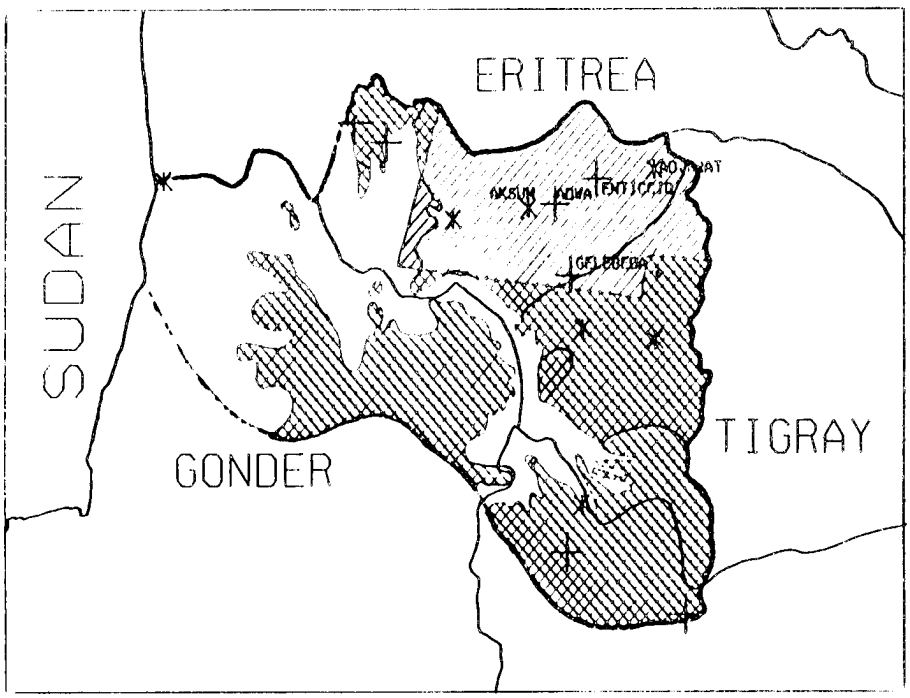
Rating	Approximate Hectarage 1985	1986	Percentage Change
Good	1,747,400	3,194,000	+83
Fair	1,942,300	1,111,900	-43
Poor	654,900	98,000	-85

25X1

25X1

25X1

NORTHERN ETHIOPIAN AREA OF STUDY
CROP CONDITIONS 1986



SURVEY SITES 25X1

✳ POPULATION AND AGRICULTURE

+ AGRICULTURE ONLY

GOOD CROPS

FAIR CROPS

POOR CROPS

AREAS RATED GOOD, FAIR, POOR BUT NO LANDSAT IMAGERY AVAILABLE

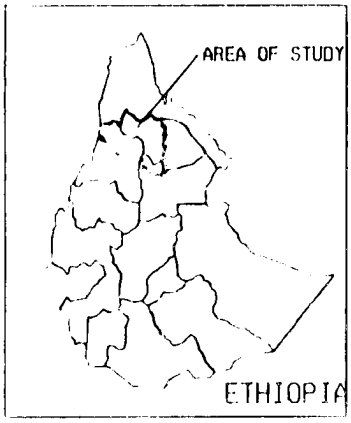
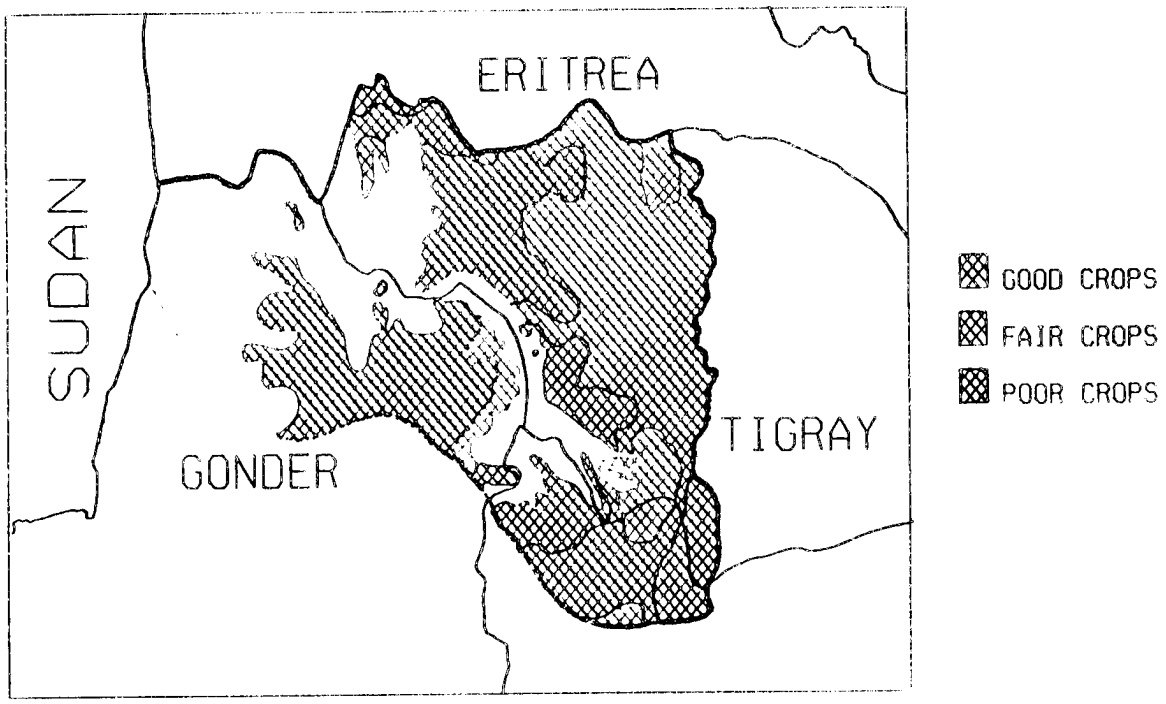


FIGURE 1

25X1

25X1

NORTHERN ETHIOPIAN AREA OF STUDY
CROP CONDITIONS 1985



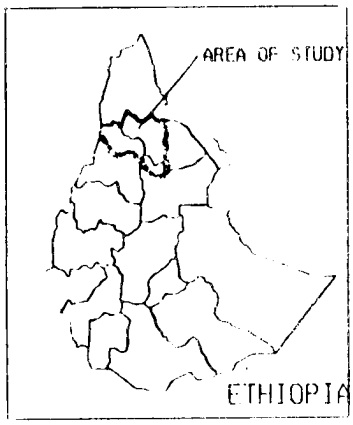


FIGURE 2

25X1

25X1

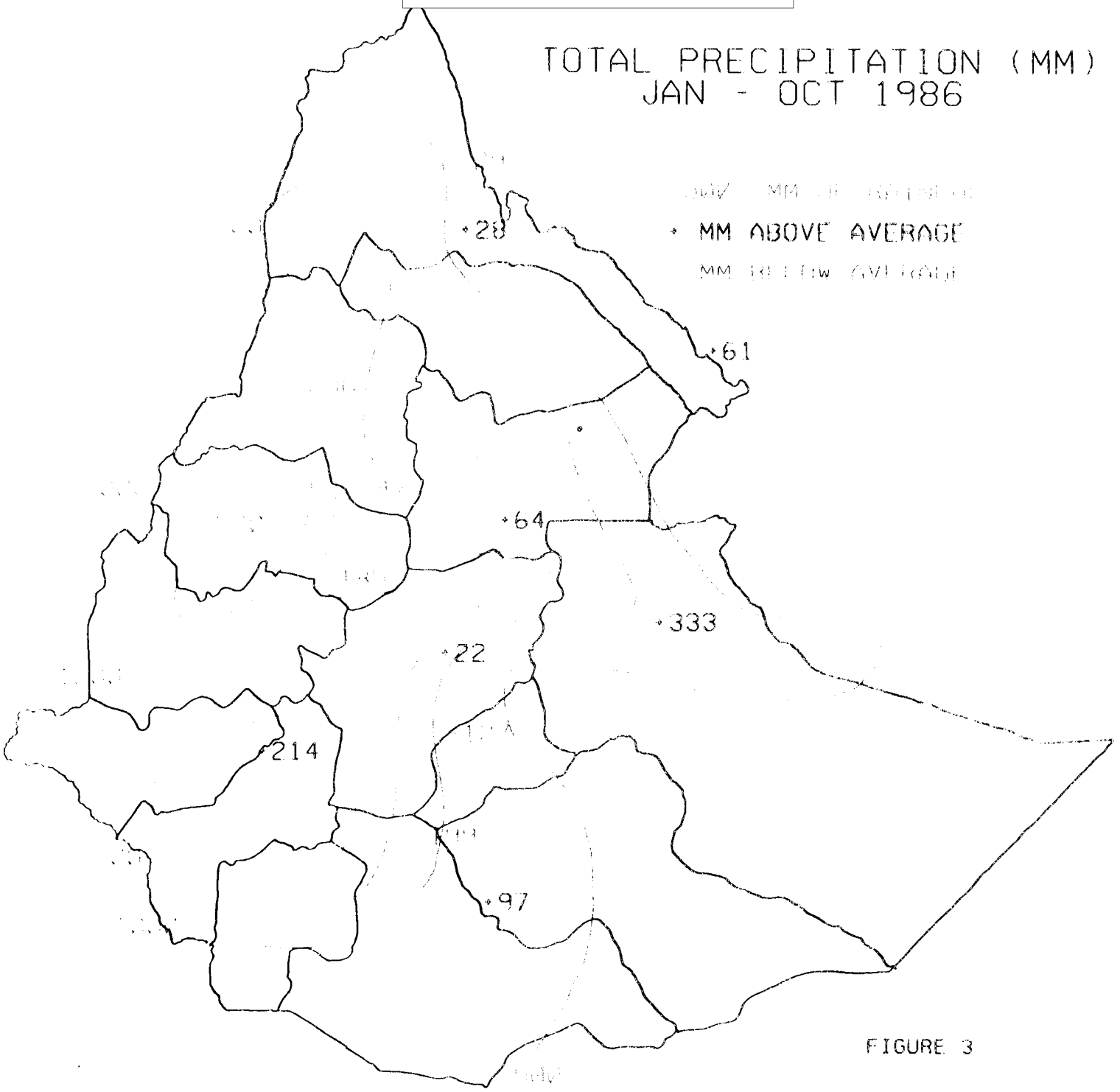


FIGURE 3

25X1